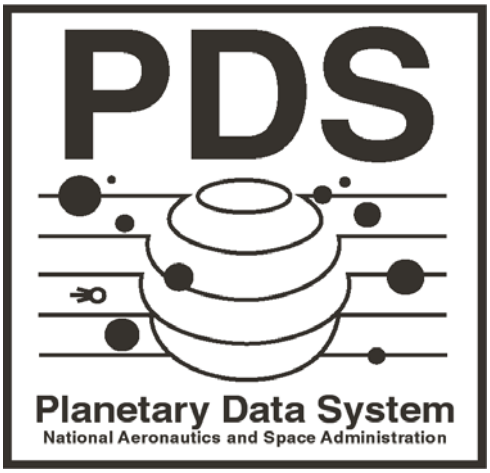
# Planetary Data System

# Validation Tool (VTool)
# Test Report

## Alpha Test Phase I

**August 28, 2006**

**Version 1.0**

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# CHANGE LOG

| Revision | Date | Description | Author |
|---|---|---|---|
| 0.20060820 | 2006-08-20 | First Draft | Law |
| 0.20060823 | 2006-08-23 | Included first analysis done by S.Hardman | Law |
| 0.20060825 | 2006-08-25 | Updated detailed responses based on R.Joyner's input | Law |
| 0.20060826 | 2006-08-26 | Completed summary and formatting | Law |
| 1.0 | 2006-08-28 | Completed issue list and incorporated R.Joyner's input | Hardman |

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## 1. INTRODUCTION

This document is the Test Report for the Phase I Alpha Testing of the PDS Validation Tool (VTool). This report documents the findings of the designated Discipline Nodes (ATMOS, GEO, and PPI) in testing the VTool application. It also includes a summary, the analysis of the results reported by the Nodes, as well as issues identified.

## 2. SUMMARY

The VTool Version 0.2.0 was released to the Nodes on August 1, 2006 for Phase I Alpha Testing. The release included the RDD and the regression test suite for the tool. The participated Nodes executed the regression test suite on their platforms of choice, as well as additional test cases using Node specific data product labels. This test phase was concluded on August 23, 2006. The detailed findings along with the corresponding analysis and issues identified are provided in Section 3 of this report.

Testing performed with the regression test suite was in general successful. The regression test results matched the baseline results with three exceptions. The exceptions are well understood and will be resolved in the future releases.

Testing performed with the Node specific test cases yielded good results. A number of issues were found with regard to features that have not been implemented yet. Many of these will be corrected in the next or subsequent release. Five issues were raised that would require Nodes involvement to resolve. A majority of the Nodes test scenarios that VTool failed to handle have already been included in the first release of the regression test suite. A few supplemental and additional Node test cases will be incorporated in the next release.

## 3. DETAILED TEST RESULTS, ANALYSIS, AND ISSUES

### 3.1 REGRESSION TEST SUITE

The regression test suite was executed on the following platforms with the following results:

Atmospheres

Mac OSX 10.4.7 (Java 1.4) – The test ran successfully with two differences:

- The first difference found in the test report for VTT_EN_1-3, occurred in the stack trace of an exception message. This exception message should be resolved in the next release, alleviating this difference.
- The second difference found in the test report for VTT_EN_19-1, is related to a non-ASCII character representation in one of the error messages. This is to be expected on different platforms. If the tool has control over the content of that message, the character will be changed to an ASCII character.

Linux RH 3 (Java 1.4) – The test ran successfully with the same first difference as listed for the Mac OSX run above.

Solaris 10 (Java 1.5.0_04) – The test ran successfully with same two differences as listed for the Mac OSX run above.

Windows XP (Java 1.5.0_06) – The test ran successfully after an initial configuration problem was corrected.

Solaris 8 (Java 1.2.2) – The test did not run successfully due to the older version of Java not being supported by the current release. The RDD was updated to specify the minimum version of Java supported.

Geosciences

Windows XP (Java 1.4.2) – The test ran successfully. The regression test results matched the baseline results with the exception of the backslash and forward slashes in the file paths of the output.

PPI

Linux RH 4 (Java 1.5.0_06-b05) – The test ran successfully but produced several differences. Although we aren't exactly sure why, it appears that the files validated by the tool were processed in a different order causing the differences. Upon further inspection of the specific reports the differences were minimal and correspond to the differences seen by the other Nodes.

### 3.2 NODE SPECIFIC TEST CASES AND ISSUES

This section captures the particulars of the Node specific tests. The following details are included and color-coded for each test:

- Test description and result, and comments received from the Node (by and large as-is)
- Analysis/conclusion of test result and test case, response and issue(s) provided/raised by EN

Atmospheres

1. A test run of the VTool application was performed against the GOPR 5001 volume.

   The tool when attempting to validate a catalog file, which technically is not supported yet, generated several errors of interest. The errors indicated that several of the values were not valid.

   This is the result of white space padding that is present in the catalog files. The tool does not yet strip the white space from those quoted values. This will be corrected in the next release.

   Issue #1: Need to determine the appropriate rules to follow with regard to stripping white space from a quoted value and how these values should be validated against the data dictionary.

   Next release will include supplemental test cases to validate this condition.

Geosciences

1. MER Mini-TES EDR Files - The validation tool successfully verified these files. One of the label files contains a History object and the validation tool threw an error due to elements contained in that object. The error seems to be technically correct according to the standards. Page A-62 of the standards notes that there are no required keywords and no optional keywords for the History object. We did want to point out that this is an example of a problem with the standards document. Test File: 2t131342693edr1151p3635n0a1.qub

   The tool does not yet support the PSDD element specification found in the Optional Elements definition. That specification allows all elements to be optional. This feature will be in the next release.

   Test case: VTT_EN_19-1\target\DATA\COMP_HISTORY-1.LBL validates this condition. New test case is not needed.

2. MER RAT EDR File - The validation tool successfully verified these files.

3. Mars Odyssey EDR GRS Files - The labels were validated successfully. For this test, we ran the tool against a data directory that included detached labels and data files. The tool threw the following message when the binary data files were encountered [ERROR unexpected char: 0x0]. Can the data files be skipped automatically or can a command allow the user to specify file extensions to test in a directory? We have several data sets with the detached labels and data files in the same directory, so this functionality will be very useful.

   The tool does not yet distinguish between label and non-label files which is covered by the L5.VAL.FR.35 requirement. This feature will be in the next release. The tool will also provide parameters for specifying files to include and exclude from a validation run, although they have not been fully implemented at this time.

   Test case: VTT_EN_1-2 contains test scenarios designed to validate partial labels. New test case is not needed.

4. CRISM Spectral Library Data Set Files - Currently we have a peer review in progress for a new PDS data set of spectral library files for the CRISM team. There are four primary data providers with slightly different labels, so we tested an example file from each group. The validation tool flagged an error of “Could not find group definition for ANALYSIS_1_PARAMETERS”, which we do not agree with. According to the standards document 13-5, the GEO node had been interpreting the rule that group names ending with “_PARAMETERS” do not require a group definition.

   This is the result of an error in the PARAMETERS group definition in the data dictionary. Because of this error, the definition is not available to compare against. This will be fixed in the copy of the data dictionary that goes out with the next release.

   Issue #2: Need to determine an appropriate fix for the PARAMETERS group definition in the data dictionary.

   Test case: VTT_EN_1-1\target\DATA\COMP_GROUPS-1.LBL validates this condition. New test case is not needed.

   Also, one of the files from this test group would not validate with the new tool. We have included this file in the email with this report. Test File: serp01_specanal_afterheating.tab

   The following error (ERROR expecting '*', found 'A') is the result of the tool encountering an unquoted N/A value. This would have been easier to determine if the message would have included the line number. We will look into this situation.

   Issue #3: Need to verify that values containing special characters must be quoted.

   Test case: VTT_EN_1-1\target\DATA\COMP_SYMBOL-1.LBL validates this condition. New test case is not needed.

5. MRO CRISM EDR For this test, we attempted to load the latest MRO data dictionary provided by Betty Sword, but the validation tool threw errors when attempting to use this data dictionary. We have included a copy of this file. Test File: pdsdd.ful

   This release of the tool requires the modified version of the data dictionary that was provided in the regression test suite. This is due to errors in the current release of the data dictionary. This will continue for the next release.

   Test case: A number of the test cases use a dictionary containing locally defined keywords (e.g., VTT_EN_1-1 and VTT_EN_1-3). New test case is not needed.

   Validation of the CRISM EDR proceeded with the standard dictionary file. We received an error about the inclusion of an object “OBJECT = EDR_HK_TABLE” in the label. According to the PDS Standards Document page 12-16 (top page example), we believe that it should not be an error. We have included the file and error report file. Test File: msw00002797_00_df092s_edr0.lbl, Output Error: CRISM_EDRresults.txt

   The EDR_HK_TABLE object is not listed in the data dictionary as a required or optional object of the FILE object resulting in the error.

   Issue #4: Need to determine whether this situation can and should be supported via the data dictionary.

   Test case: Next release will include supplemental test cases to validate the explicit FILE object.

6. MRO SHARAD EDR - Only one issue was encountered with this group of files. There was an example in a label of a line length greater than 80 characters, but no error was indicated.

   This is covered by requirement L5.VAL.FR.37 and has not been implemented yet. This will not be in the next release.

   Test case: Next release will include supplemental test cases to validate this condition.

7. Additional Comments - Almost all validation output and the baseline reports displayed the following line prior to the names of the files validated. [ERROR line 1644:15: unexpected token: GROUP] This may be intentional, but it was somewhat confusing.

   This is the result of what we consider an erroneous object type definition of GROUP for the PARAMETERS object in the data dictionary and relates back to Issue #2. If not resolved officially by the next release, we will just fix it in our local copy to alleviate the error.

   Test cases that validate this condition include:

a) VTT_EN_1-1\target\DATA\COMP_GROUPS-1.LBL
b) VTT_EN_1-3\target\DATA\NONCOMP_SYNTAX-019.LBL
c) VTT_EN_1-3\target\DATA\NONCOMP_SYNTAX-020.LBL
d) VTT_EN_1-3\target\DATA\NONCOMP_SYNTAX-021.LBL
e) VTT_EN_1-3\target\DATA\NONCOMP_SYNTAX-022.LBL
f) VTT_EN_1-3\target\DATA\NONCOMP_SYNTAX-023.LBL

New test case is not needed.

PPI

1. Running on sample of PPI labels produced good results. Labels did validate. One systematic problem occurred. Which was that the data dictionary does not contain all valid values for certain terms. For example, the MISSION_PHASE_NAME does not contain the Galileo target list. These had been submitted to EN in the past.

   Although this is not an issue with the tool, it has been forwarded to the Standard Coordinator for resolution.

2. In an attempt to use multiple data dictionary and to override (or supplement) the main dictionary with terms that have valid lists the documentation for the tool was inadequate. By experimentation it was discovered that once a term is defined it is not altered. So, by placing the dictionary containing the local override first we were able to fully validate some labels. This should be noted in the help.

   This feature has not been fully implemented yet and was noted in the RDD. This feature will be in the next release.

   Some of the test cases include locally defined keywords that could be provided in distinct dictionaries. As this functionality was not implemented, the test suite application that executes the test cases has been purposely written to only exercise a single dictionary.

3. Not all tests listed in the test plan are in this release. In most cases the negative tests are not present. That is, checks where things are designed to fail. For example, pointers where the referenced file does not exist. All tests should be included before alpha testing is considered complete.

   The next release will address the inconsistency between the trace matrix in the test plan and the test case directory structure and will be better organized. It became clear while writing the test cases, that there was considerable overlap / duplication of tests defined in the test plan. There are 11 directories that address “non-compliant” tests (e.g., VTT_EN_1-3 contains 110 test cases which validate specific instances of non-compliant syntactic validation).

4. Many of the labels used in the tests are invalid labels and generate errors. Since these errors have been captured in the baseline "reports" a simple "diff" indicates a

"pass" even though there are errors. This seems misleading. An example is the VTT_EN_1-2 tests.

The test cases will (at some point in the future) become the basis for ascertaining if programming changes have negatively affected VTool. Principally, this will be done by using the following simplistic algorithm:

a) A test case passes validation by VTool if the content of the report generated locally matches the content of the baseline report.
b) A test case fails validation by VTool if the content of the report generated locally does not match the content of the baseline report.

5. The wording for some tests described in the test plan is confusing. For example tests to confirm that the tool can detect errors (or non-compliance) are stated as "Validate that a single PDS-3 non-compliant label..." with the expected result of "PASS". What's strange is that the expected result of any test should always be "PASS" (that is, that the criteria for the test are met). Considering that it's a test plan for the tool shouldn't tests for non-compliance expect a "FAIL" state from the tool?

   Test case: Paragraph 2.2 of the test plan succinctly describes the design of the test cases and the expected results:

   There are two possible outcomes in running VTool against a test case:

   - **PASS** – In the case of a PDS compliant label, VTool correctly identifies the label as being compliant (i.e., no ODL anomalies are erroneous identified). In the case of a PDS non-compliant label, VTool correctly identifies those portions of the label that are non-compliant and accurately reports the anomalies).

   - **FAIL** – In the case of a PDS compliant label, VTool incorrectly identifies the label as being non-compliant ( i.e., ODL anomalies are identified and reported). In the case of a PDS non-compliant label, VTool was not able to identify the non-compliant portions and fails to report the anomalies).

   All of the test cases in the regression suite will be written such that the expected result is to PASS validation given that VTool has the functionality required to validate the test case.

6. Pointers are not being resolved. There is no indication that a file referenced by a pointer does not exist. Also when a file does exist it is not being processed and so label validation is incomplete.

   This feature has not been fully implemented yet and was noted in the RDD. This feature will be in the next release.

Test case: The following test case validates that the file referenced by the pointer does not exist: VTT_EN_22-3\target\DATA\W1477654052.LBL. The next release will further refine pointer resolution conditions.

7. Type checking is not being performed. For example, when a keyword is designated as an identifier the ODL specification (Section 12.3.4) does not allow quotes. Yet labels with quoted values for identifiers are not marked as an error.

   Issue #5: Need to clarify with the Nodes that this is the expected behavior.

8. The tool parses all files as though they were labels. The tool should first peek at the beginning of file to determine if the first line (second if there's an SFDU) starts with "PDS_VERSION_ID". If the file does not start with "PDS_VERSION_ID" it should not attempt to parse the rest of the file. It could simply state "Not a PDS label". This is especially important on files which do contain non-PDS keyword=value syntax such as images with a VICAR header (see COMP_IMG-1.IMG in VTT_EN_1-2)

   This feature has not been fully implemented yet and was noted in the RDD. This feature will be in the next release.

   There are a large number of test cases validating that the 1st line is either an SFDU immediately followed by PDS_VERSION_ID or the 1st line is PDS_VERSION_ID.

9. Cross keyword checking. The value of some keywords serve as a constraint on values allowed for other keywords. For example, if the SAMPLE_TYPE is IEEE_REAL the minimum number of SAMPLE_BITS is 32 since the smallest possible IEEE_REAL is 4 bytes. It is erroneous to assert otherwise. (see COMP_IMG-1.LBL in the IMAGE object for an example)

   We do not currently have a requirement for this feature.